

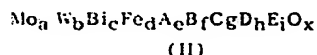
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 NIPPON SHOKUBAI CO LTD *JO 3294-239-A
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 Acrolein and acrylic acid prepn. in higher yield - by gas phase oxidn.
 of propylene with molecular oxygen over multilayer catalyst bed
 C92-023098

Prepn. of acrolein (I) and acrylic acid comprises gaseous phase catalytic oxidation of propylene with molecular oxygen over a complex oxide catalyst of formula (II)

Multi-pipe reactor is used. Catalysts are packed into individual pipes of the reactor to fine layers in order of activity from low to high in axis direction of pipe from inlet to outlet of material gas to prepare a fixed catalyst bed.



A = Ni and/or Co.

B = One or more alkali metal thallium.

C = One or more of alkali earth metal(s).

D = One or more of P, Te, Sb, Sn, Ce, Pb, Nb, Mn, As and Zn.

A(1-D5, 1-D8) E(10-C4G, 10-D1A) N(1, 2-A, 2-B, 2-C, 3, 4-A, 4-B)

E = One or more of Si, Al, Ti and Zr, and

a, - i and x = Atomic ratios, a = 1-2, b = 0-10, c = 1-10,

d = 0.1-20, e = 2-20, f = 0-10, g = 0.001-10,

h = 0-4, i = 0-30, x is determined on other elements valencies.

ADVANTAGE

Local overheat of catalyst bed can be avoided. (II) shows high activity for a long period, and (I) is prepd. in higher and more steady yield than prior arts.

PREFERRED CONDITIONS

The material gas comprising propylene 1-10 vol%, molecular oxygen 3-20 vol%, steam 0-60 vol%, and inert gas 20-80 vol% is fed to the reactor at SV 300-5,000 hr⁻¹. The reaction of propylene with molecular oxygen is carried out 250-450°C under ordinary pressure to 10 kg/sq.cm.

EXAMPLE

Catalyst A (Mo_{1.2}W₂Bi₁Fe₁Co₁Ni₂Cs_{0.06}Ba_{0.1}Si_{1.35}, 750ml) and catalyst B (Mo_{1.2}W₂Bi₁Fe₁Co₁Ni₂Cs_{0.06}Ba_{0.5}Si_{1.35}, 750 ml) were packed into pipe reactor (25.4mm φ) to prepare a fixed catalyst bed. The catalyst bed was heated at 310°C.

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mixt. of propylene 8 vol%, molecular oxygen 14.1 vol%, steam 25 vol% and nitrogen 52.9 vol% was fed to the reactor at SV 1,600 hr⁻¹. Conversion of propylene was 97.8%, and selectivity coefficient of (I), acrylic acid was 86.6%, 9.7%, resp. (8ppW129HWDwgNo0/0)

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